

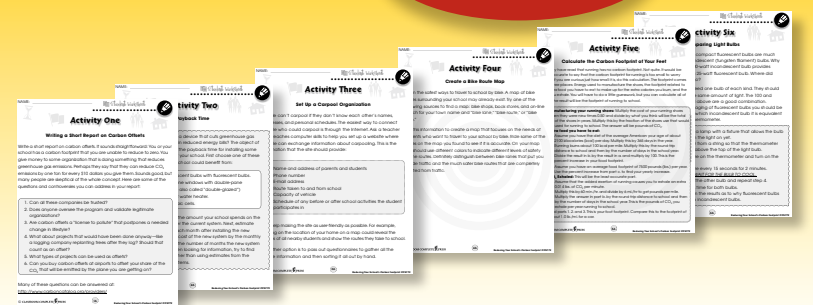
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How Your School Uses Energy

1. **Circle** the word **TRUE** if the statement is TRUE or **Circle** the word **FALSE** if it is FALSE.

- a) All school buildings are designed to be energy efficient.
TRUE FALSE
- b) Most electricity is generated by burning fossil fuels.
TRUE FALSE
- c) Heating uses energy, and air conditioning saves energy.
TRUE FALSE
- d) Sunlight can be used to heat water.
TRUE FALSE
- e) Sunlight can be used to generate electricity.
TRUE FALSE

2. Put a check mark (✓) next to the answer that is most correct.

- a) The letters **EPA** stand for
 - A Earth Positive Association
 - B Evergreen Planting Activity
 - C Environmental Protection Agency
 - D Ecological Practices Advancement
- b) Which energy source is used to generate most of the electricity in the United States?
 - A oil
 - B coal
 - C nuclear
 - D hydroelectric
- c) What is the main advantage of double pane windows?
 - A They are stronger.
 - B They do not fog over.
 - C They reduce heat loss.
 - D They are easier to clean.



How Your School Uses Energy

Experts believe that one-fourth of the six billion dollars American taxpayers spend on school energy use is wasted. In this chapter we will look at some ways to reduce this waste by improving the efficiency of the ways energy is used in schools, including heating, cooling, and lighting.



Anything that burns fossil fuel or uses electricity at your school contributes to global climate change. You might think that electricity releases

Learn more about this symbol at: <http://www.energystar.gov/index.cfm?c=home.index>

no CO₂, but remember that most electricity is produced by burning fossil fuels. Now we will look at ways that schools use energy.

Most schools have a heating system for cold days and a **ventilation** system to move air around and keep it fresh. Many schools also have an **air conditioning** system for hot days. These three systems work together in what is called the heating, ventilating, and air conditioning system or **HVAC**. Some HVAC systems are much more energy efficient than others. If an HVAC system meets a certain standard of efficiency, it is given an **Energy Star** rating by the **Environmental Protection Agency (EPA)** and marked with the symbol shown above.

STOP Explain how using electric lights increases CO₂ emissions into the atmosphere.

Try to find out which things in your school have an Energy Star rating. In addition to the HVAC system, look for the ratings on computers,



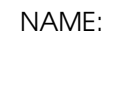
How Your School Uses Energy

1. **Circle** the word **TRUE** if the statement is TRUE or **Circle** the word **FALSE** if it is FALSE.

- a) HVAC stands for heating, ventilation, and air conditioning.
TRUE FALSE
- b) Incandescent light bulbs are more energy efficient than fluorescent light bulbs.
TRUE FALSE
- c) Much of the money spent on energy for schools is wasted.
TRUE FALSE
- d) Using electricity usually adds to a school's carbon footprint.
TRUE FALSE
- e) Double pane windows make air conditioning less efficient.
TRUE FALSE
- f) Photovoltaic cells use hydrogen to generate electricity.
TRUE FALSE

2. Put a check mark (✓) next to the answer that is most correct.

- a) What is the name of the seal put on appliances that shows they are energy efficient?
 - A HVAC
 - B Energy Star
 - C Photovoltaic
 - D Carbon Footprint
- b) On some days energy can be saved by turning off the air conditioning and
 - A turning on the heat.
 - B turning on the lights.
 - C opening the windows.
 - D raising the window blinds.
- c) Large flat roofs are a good place to install
 - A air conditioners
 - B photovoltaic cells
 - C fluorescent lights
 - D double pane windows



How Your School Uses Energy

3. Answer the questions in complete sentences.

- a) Describe two ways to save energy used for school lighting.

- b) Describe two ways to save energy used to power a school's HVAC system.

Extensions & Applications

In each square of the right-hand column of the graphic organizer below, describe a way to reduce energy use for the energy need listed in the square to the left.

School Energy Need	How to Reduce Energy Use
Heating	
Air conditioning	
Hot water	
Lighting	

See page 12 for Final Version Worksheet.

Carbon Footprint Calculator (Continued)

1 Student Number	2 Miles Traveled by Bus	3 Miles Traveled by Car	4 Number of Students in Car	5 Column 3 Divided by Column 4
------------------------	----------------------------------	----------------------------------	--------------------------------------	-----------------------------------------

Write zeroes in columns 2 through 5 for students who walk or bike to school. If you or a friend can set this up as an excel file, you will save time. To calculate your school's travel footprint:

- Find the totals of columns 2 and 5.
- Multiply the total of column 2 by 0.24 and the total of column 5 by 1.0.
- Add the results in step 2 and divide the sum by the number of students surveyed. This is the average travel footprint in lbs. of CO₂/day.
- Multiply the result of step 3 by average attendance, then by the number of school days in a school year.
- Divide the result of step 4 by 2000 and write the answer here: _____ **tons CO₂/year.** This is your school's travel footprint.

Food

Only do this calculation if your school has a cafeteria. Ask the cafeteria staff how many students eat there on an average day, if their food is organic, and if it is grown locally.

- Begin with the number 8.22 lbs./student-day.
- Subtract 0.55 if the food is organic and 0.37 if it is grown locally.
- Multiply the result by the number of students eating there per day and then multiply by the number of days in the school year.
- Divide the result of step 3 by 2000 and write the answer here: _____ **tons CO₂/year.** This is your school's food footprint.

Recycling and Trees

For this calculation you will need to find out how many tons of waste material your school sends to a landfill, and you will need to count the trees on the school's property. Begin with the number 2.18 tons of CO₂/ton of waste. Subtract 0.42 if food waste is composted. Likewise, subtract 0.43 if paper is recycled, 0.25 if cans are recycled, and 0.07 each if glass or plastic are recycled.

Multiply the result by the number of tons of waste your school sends to a landfill each year, and write the answer here: _____ **tons CO₂/year.** This is your school's waste footprint.

Add the result above to the results for energy, transportation, and food, write the answer here: _____ **tons CO₂/year.**

Multiply the number of trees on school property by 0.020 and write the answer here:

minus _____ **tons CO₂/year.**

Subtract this amount from the amount above and write the answer here: _____ **tons CO₂/year. This is your total school carbon footprint!**

Word Search

Find all of the words in the Word Search. Words are written horizontally, vertically, diagonally, and some are even written backwards.

adapt	carbon footprint	energy star	kilowatt-hours	photovoltaic
atmosphere	carbon offset	EPA	HVAC	reactant
carbon	carpool	global	incandescent	therm
carbon dioxide	climate change	greenhouse gas	photosynthesis	VOC

A	B	T	N	E	C	S	E	D	N	A	C	N	I	C	D
E	K	F	G	R	A	T	S	Y	G	R	E	N	E	H	I
J	I	K	L	C	R	R	E	A	C	T	A	N	T	M	T
N	L	O	P	I	B	Q	R	A	E	C	A	R	B	O	N
S	O	T	U	A	O	V	R	W	X	L	Y	Z	A	B	I
E	W	C	D	T	N	P	E	F	G	I	O	H	I	J	R
R	A	C	K	L	O	L	M	N	O	M	E	B	P	Q	P
E	T	R	O	O	F	S	T	U	V	A	W	X	A	Y	T
H	T	Z	L	V	F	A	B	C	D	T	E	F	G	L	O
P	H	O	T	O	S	Y	N	T	H	E	S	I	S	H	O
S	O	I	J	E	K	L	E	H	C	M	N	O	P	F	
O	U	Q	R	O	T	P	R	V	S	H	T	T	U	V	N
M	R	W	X	H	Y	M	A	Z	A	A	B	P	C	D	O
T	S	E	F	P	G	C	H	I	J	N	K	L	A	M	B
A	N	O	P	Q	R	S	T	U	V	G	W	X	Y	D	R
Z	S	A	G	E	S	U	O	H	N	E	E	R	G	A	A
B	C	D	E	D	I	X	O	I	D	N	O	B	R	A	C

Comprehension Quiz

Part C

Answer each question in complete sentences.

- What does the Energy Star rating mean? 3

- What is carpooling? 3

- What is a carbon offset? 3

- What is an idle free zone? 3

- What is the easiest way to remove carbon dioxide from the atmosphere? 3

SUBTOTAL: /15

Lower Your School's Carbon Footprint Inside Initiatives

Use Reusable lunch containers

Recycle what you can

Turn down the heat in the winter
Cut back on Air Conditioning in the summer

Classroom

Turn off the lights when not in use (use energy efficient light bulbs)

Use both sides of the paper

Unplug electrical equipment when not in use



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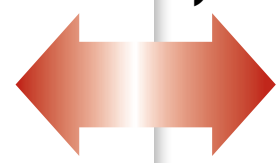
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- C opening the windows.
- D raising the window blinds.

c) Large flat roofs are a good place to install

- A air conditioners
- B photovoltaic cells
- C fluorescent lights
- D double pane windows



1.

- a) TRUE
- b) FALSE
- c) TRUE
- d) TRUE
- e) FALSE
- f) FALSE

2.

- a) B
- b) C
- c) B

10

3.

- a) (Answers will vary.)
Change to energy efficient bulbs and raise blinds on a sunny day.
- b) (Answers will vary.)
Open windows and turn off AC. Install double-paned windows.

Extensions & Applications

School Energy Need	How to Reduce Energy Use
Heating	Install better insulation and double-pane windows.
Air conditioning	Open the windows and turn off the air conditioning when outside temperature permits.
Hot water	Install solar water heaters on school roof.
Lighting	Raise the blinds and turn off some of the lights.



EASY MARKING ANSWER KEY